

ON A FOSSIL HUMERUS.

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A humerus which seems to deserve attention from students of our drift fauna has lately been received by the Queensland Museum from the Darling Downs. In size it is about one-third less than the arm bone of a *Diprotodon*, and at a passing glance is a reduced copy of that bone. A little scrutiny, however, and differences are seen to exist, which in the aggregate amount to at least specific variation, and no sooner do we acknowledge that degree of distinctiveness, than we are prompted to ask whether we can accept it as a specific one only—in other words whether we may fairly conclude from it that there existed in company with the great *Diprotodon*, a comparatively small and not very closely similar species of the genus. The obvious objection to this is that we have no confirmatory evidence, more especially not a solitary tooth, whereby to justify the assumption—and considering the multitude of jaws of *Diprotodon* and its associations occurring in the drift, the total absence of the teeth of this assumed species is a fair though negative ground for putting aside the idea of its existence. But if we do, there is nothing known to which the humerus in question can be attributed. In size indeed, it corresponds to the probable dimensions of the bone in *Nototherium Mitchelli*, but to that animal a humerus of quite a different kind has been already appropriated. Is it possible that exception may reasonably be taken to that appropriation? The suggestion is ventured, and the considerations which have led to it are offered with the utmost deference.

The genus *Nototherium*, was established by Professor Owen in 1844, for the reception of the animal represented by certain molar teeth, with which we are now familiar—teeth with closed fangs, and therefore of limited growth—teeth which “suggested at first sight that the fossils might belong to some smaller species of *Diprotodon*.” (*Foss. Mam.* p. 249.) When, subsequently, the skull of *Nototherium* came into his hands, Professor Owen was led to recognize in it certain marks of affinity with the *Wombats*,

and in determining that relationship, he seems to have allowed even more weight to the cranial than he had previously conceded to the dental characters of the animal which he had then regarded as less nearly allied to *Phascolomys* than *Diprotodon* appeared to be.

It is almost needless to say, that from the Nototherian type of dentition, that of the Wombats, recent and extinct, differs to a degree which in placental mammals would be considered extreme. In *Phascolomys* the teeth have, as all are aware, persistent pulps, and therefore continuous growth. Professor Owen carefully points this out to us at p. 286, where, after correlating *Nototherium* with *Macropus* and *Diprotodon* with *Phascolomys* by virtue of the front upper incisor, he goes on to say—"But in the number and disposition of the upper incisors as in the bilophodont molars of limited growth, both the larger extinct genera retain the poeophagous character as contradistinguished from the rhizophagous modification shown by the Wombats among the existing marsupial herbivores." and further, speaking of the lower incisors, says that in the adult *Nototherium*, "this tooth is far from having the proportions and depth of implantation which make it resemble in *Diprotodon* the lower pair of scalpriform teeth of the Wombat." These quotations are necessary to show Professor Owen's opinion of the affinities of the several genera as determined by the teeth. We are clearly taught that in their molars neither genus of the huge grazers is allied to the Wombats, and that in the incisors *Diprotodon* indeed resembles "approximates" *Phascolomys*, but that *Nototherium* does not even this—in brief that the old dentition of the latter differs widely from that of the Wombat, more widely than does that of *Diprotodon*. Now bearing in mind that our safest conceptions of the structure of an extinct mammal are based upon its dentition, bearing also in mind that *Diprotodon* was according to its dentition a browsing beast of mighty bulk, and that we know nothing of it contradictory of the general analogy of limb structure in other such beasts, namely, that their long bones are little more than pedestals of support, we are prepared to admit without hesitation, the justness of Professor Owen's ascription to it of the

thigh bone figured in plate XXXIV. of the "Fossil Mammals." Further, as it is but reasonable to infer that the fore limb of the animal would be characterised by the like massive simplicity we are perfectly ready to concur with the illustrious author of the Fossil Mammals in attributing to *Diprotodon* the humerus given in plate XXXI., it is in fact, just such a bone as we should have looked for. From that recognition we should obtain a just conception of the general form of the arm-bone of *Nototherium*, assuming only that it was rather more unlike that of the *Wombats* than the one delineated. If on comparing *Diprotodon* and *Phascalomys*, we are most willing to admit that the very unlike teeth of the *Wombat* are attended by a very unlike humerus, a bone formed by or for powerful action in different directions, squat, angular, twisted and covered with ridges and asperities, as wont is with fossorial arm-bones we are the less disposed to look in that direction for the humerus of *Nototherium*. It is therefore with perplexity that we look upon the bone figured in plate XXXVII., as the *Nototherian* humerus—a perplexity increased by the absence of any reasons declaring for the determination. *Nototherium*, Owen, as established on the teeth, and *Nototherium*, Owen, as represented by the humerus, are or appear to be two animals—it would be highly interesting to know why we should believe in their identity. The subject of plate XXXVII., is pronouncedly phascolomine. Prof. Owen directs our special attention to the phascolomyan characters which may in truth be said to be exaggerated in it. If the bone be really the humerus of *Nototherium*, that animal could scarcely have been a remove from the genus *Phascalomys*, and it was to all appearance a burrower, whilst its relative the *Diprotodon*, said to be the nearer to *Phascalomys* by dentition, was in the structure and office of its fore limb a mere marcher. It is surely improbable that so great a difference should exist between the arm-bones of two animals so closely allied in dental characters as to have been nearly placed at first sight in the same genus without direct or at least good constructive proof to the contrary, we cannot allow a much greater latitude of differentiation to the limb bone than we find in the teeth. On the other hand, we

cannot well refuse to a bone presenting an about equal phase of differentiation a preferential claim on our recognition. Such a bone is the one of which I now submit a cast. The general likeness it bears to the Diprotodon arm-bone becomes apparent when it is laid beside a cast of the latter humerus. It only remains to invite attention to its characteristic features, premising that its adult condition is evidenced by the state of the epiphyses.

The ratios of the length and breadth of the bone under review to the length of the lower molar series of the *Nototherium Mitchelli* are nearly the same as the proportions between the like elements of comparison in its most gigantic relative; the proportion of the length to the breadth is exactly the same in the bones of both animals. The head of the *Nototherian* bone is of the same general form as in *Diprotodon*, and rises but slightly above the level of the outer tuberosity, in the latter respect differing from the fossil figured in plate (*Foss. Mam.*), which however, appears to be somewhat imperfect, but agreeing almost precisely with the original of the accompanying cast. The other tuberosity is in both animals well developed, and surmounted by a low fore-and-aft ridge. The rough ridge representing the inner tuberosity is in *Nototherium* on a lower transverse parallel than in *Diprotodon*—in the latter the depression between it and the head is on the plane of the outer tuberosity, whereas in the former the highest (most proximal) point of the depression is fully an inch below the tuberosity. The bicipital groove is shallower in *Nototherium* than in *Diprotodon*. On the fore side of the shaft the broad ridge falling from the outer tuberosity is much fuller at its origin in the smaller bone, in the larger it curves gently and regularly as it descends, maintains a nearly level summit from near the tuberosity to the beginning of the middle fifth of the shaft, then subsiding very gradually disappears midway between the lateral edges of the shaft in *Nototherium*, commencing at once on the level of the tuberosity it goes straight and full to scarcely the upper third of the shaft, increases for a space in height, then curving suddenly outwards ends abruptly nearer (comparatively) to the head and to the outer edge. The external tubercle has the same situation in both bones,

i. e., in the middle of the outer edge, but by no means the same form, in *Diprotodon*, it is a compressed widely expanded ridge, in *Nototherium* a bilobed tuberosity. The rough surface on the upper part of the back of the shaft described and figured as a well-defined oval in *Diprotodon* is in *Nototherium* very rugose, but shapeless and indefinite in extent. The lateral expansion of the distal end of the shaft has a gradual increment in *Diprotodon*, a comparatively sudden one in *Nototherium*. The inner condylar ridge is, as might be expected imperforate in the smaller, as it is in the larger animal—otherwise also they are much alike in this region. In the ectocondylar ridge on the other hand, they differ markedly. In *Nototherium* it commences much nearer the external ridge, and is suddenly flattened out into an almost wing-like expansion; it is also much less angular. The condyles in *Nototherium* are relatively less in fore-and-aft thickness, and are set on much more obliquely to the long axis of the bone. In form they differ but little from those of *Diprotodon*, but the trochlear constriction between them is much greater. The olecranal fossa is more limited in extent and of greater depth.

It will be seen that the characters of the bone under examination bring it well within the range of family resemblance, and at the same time keep it aloof from a strictly generic likeness to the humerus of *Diprotodon*. It may be acknowledged that these are conditions which can only be fulfilled by a humerus of *Nototherium*. Should this judgment appear sound, the theory which has gained popular headway that *Nototherium* was an animal midway between a Kangaroo and Wombat, will be so far unsupported. Deprived of its phascolomine arm-bone, it will appear that, inasmuch as it was a marsupial and a herbivorous one, it had certain minor points of resemblance to its extant relatives, but that these are in themselves quite insufficient to prove that its relatives are anything nearer than cousins germane.